Wisconsin
Department of Commerce

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(Replaces 960051-u)

Environmental & Regulatory Services Division
Bureau of Petroleum Products and Tanks
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin COMM 10 Material Approval

Equipment: TM-2, TM-3, TM-4, EMC, EMC-PC, EMC/ESS, EMC/CSLD Automatic Tank Gauging, Volumetric Tank Tightness Testing, Line Leak Detection, and Liquid and Vapor Monitoring Systems

Manufacturer: Gilbarco, Inc.
P. O. Box 22087
Greensboro, NC 27420-2087

Expiration of Approval: December 31, 2007

SCOPE OF EVALUATION

The sensing probes used with the Tank Monitor 2 (TM-2), Tank Monitor 3 (TM-3), Tank Monitor 4 (TM-4), Environmental Management Consoles (EMC Series), including Basics and PC series, Volumetric Line Leak Detector (VLLD), Pressurized Line Leak Detector (PLLD), Wireless Pressurized Line Leak Detector (WPLLD), External Sensor System (ESS), Above-Ground Tank System (ATS), and Continuous Statistical Leak Detection option (CSLD), distributed by Gilbarco Inc., have been evaluated for use as leak detection equipment conforming to specific portions of **ss. Comm 10.61** and **10.615** of the current edition of the Flammable and Combustible Liquids Code.

This evaluation summary is condensed to provide the specific installation, application and operation parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – Comm 10.

DESCRIPTION AND USE

All versions of the Automatic Tank Gauges (ATG), Tank Tightness Testing (TTT), and line leak detection systems may be used with gasoline, diesel fuel, aviation fuel, and solvents.

Tank Leak Detection

Probe-Console Application Chart (Tanks)

Probe No.	Application	TM-2	TM-3	TM-4	EMC	EMC-PC[1]	EMC-ATS[2]
PA0238000XXXX	ATG	X	X		X		
PA0264XXX0000	TTT or ATG	X	X		X		
PA0265XXX0X00	TTT or ATG	X	X		X	X	X
PA0300XXXXXX0	TTT or ATG	X	X		X	X	X
PA0265XXX0X00 w/CSLD	Monthly Monitor				X		
PA0300XXXXXX0 w/CSLD	Monthly Monitor				X		

1: This version of the EMC console and probe combination is only qualified as an ATG system for monthly monitoring (0.2 gph).

2: This version of the EMC console is designed for use with aboveground tanks to provide gross inventory estimation along with interstitial and sump monitoring. The capabilities or accuracy of the probes for inventory control were not evaluated by 3rd party testing for this application.

The **PA0300XXXXXX0** and **PA0265XXX0X00** probes measure changes in product volume by detecting changes in the level of a float using the magnetostrictive principle. The **PA0264XXX0000** and **PA0238000XXXX** probe versions measure changes in product volume by measuring changes in capacitance. These probes, when used with the appropriate consoles, have a preset leak detection threshold that cannot be changed by the operator, installer or technician. Results are reported as “Passed” or “Failed”.

The **CSLD** option operates in a long term sampling mode using statistical analysis to evaluate product and temperature levels collected by the probes every few seconds. The system identifies periods during product dispensing, stabilization periods after product delivery and periods of temperature instability and ignores data from those periods.

The system prints a leak test report daily or on demand. The report indicates a pass, fail or inconclusive result using data from up to, but no more than, the preceding 28-day period.

Line Leak Detection

Probe-Console Application Chart (Line)

Probe No.	Application	TM-2	TM-3	TM-4	EMC	EMC-PC[1]
PA02630000501/VLLD	3, 0.2, 0.1 gph				X	X
PA0316XXXXXXX/HGVLLD	3, 0.2, 0.1 gph				X	X
PA0263000XXXX/PLLD	3, 0.2, 0.1 gph				X	X
PA0263000XXXX/WPLLD	3, 0.2, 0.1 gph				X	X

1: The EMC-PC series console is the same as the EMC series console for LLD, the only difference is the EMC-PC has a cover panel that includes a PC interface connection.

EMC Volumetric Line Leak Detectors

The Gilbarco EMC Volumetric Line Leak Detectors, **PA02630000501/VLLD** and **PA0316XXXXXXX/HGVLLD** use a preset threshold and a single test to determine if a pipeline is leaking. The system declares a leak if the output of the measurement system exceeds a threshold of 1.5 gph @ 10 psi when used as an automatic line leak detector, 0.1 when used as a monthly monitor, and 0.079 gph when used as a line tightness test.

The Flexible Pipeline Option version of the Gilbarco EMC Volumetric Line Leak Detector operates in a similar manner. A leak is declared if the output of the measurement system exceeds a threshold of 1.5 gph at 10 psi when used as an automatic line leak detector, 0.1 gph at system pressure when used as a monthly monitor and 0.079 gph when used as a line tightness test.

EMC Pressurized Line Leak Detectors

The Pressurized Line Leak Detector for both rigid and flexible piping, **PA0263000XXXX/PLLD**, and the Wireless Pressurized Line Leak Detector for rigid piping, **PA0263000XXXX/WPLLD**, operate during idle periods by independently pressurizing the pipeline system, then isolating the system from the pump and monitoring the pressure drop. The pressure drop is measured for several pressurization cycles, which are determined by the equipment. When the leak detection system determines that thermal effects have been sufficiently reduced, it compares the final pressure drop with a preset limit. If the pressure drop exceeds that limit, a leak is declared.

Liquid Sensors

The following chart shows the appropriate consoles to be used with sensing probes, and the typical application/capability for each probe.

Sensor-Console Application Chart

Probe No.	Application	TM-2	TM-3	TM-4	EMC	EMC-ESS	EMC-ATS[1]
PA02591XXXXXX	Steel Tank[2]		X	X	X	X	X
PA02590XXX000	Fiberglass Tank[2]		X	X	X	X	X
PA0259300000 1 and 2	Hydrostatic (FRP)[3]		X	X	X		X
PA02890000341 Solid State	Discriminating (FRP)[4,5]				X		
PA02592XXXXXXSinglefloat	Sump[2]		X	X	X	X	X
PA02594000011 Solid State	Sump[2]				X		
PA02890000350 Solid State	Discriminating-Sump[4,5]				X		
PA02890001350 Dual Float	Discriminating-Sump[4,5]				X		
PA02595000011 Solid State	Dispenser Pan[2]				X		
PA02890000320 Solid State	Discr.-Disp. Pan[4,5]				X		
PA02890001320 Dual Float	Discr.-Disp. Pan[4,5]				X		
PA02700000002 Solid State	Micro[2]				X		
PA02660000000	Vapor[6]				X	X	
PA02700XX000X	Groundwater[4]				X	X	

1: This version of the EMC console is designed for use with aboveground tanks to provide gross inventory estimation along with interstitial and sump monitoring. The capabilities or accuracy of the probes for inventory control were not evaluated for this application.
2: Capable of detecting any liquid that exceeds the threshold level.
3: Monitors the level of ethylene glycol or calcium chloride solution in the interstitial of a fiberglass double wall tank.
4: May be used for gasoline, synthetic fuel, diesel fuel, fuel oil, aviation fuel, and solvents.
5: Capable of detecting water.
6: Gasoline or JP-4 jet fuel.

TESTS AND RESULTS

Tank Tightness Testing Systems

The performance of the **PA0264XXX0000, PA0265XXX0X00** and **PA0300XXXXXX0** probes was determined in accordance with the EPA Protocol for volumetric tank testing methods. The probes were found to be capable of detecting a leak of 0.10 gallon per hour leak within a probability of detection (P_D) of 95 percent and probability of false alarm (P_{FA}) of less than 5 percent.

Automatic Tank Gauging Systems

The performance of the **PA264XXX0000, PA0265XXX0X00** and **PA0238000XXXX** probes were determined in accordance with the EPA protocol for ATG systems.

The **PA0264XXX0000, PA0265XXX0X00, PA0238000XXXX** probes were certified to within the 95-5 ranges required by the EPA protocols for detecting a leak of 0.20 gallon per hour.

CSLD Monthly Monitoring

The Gilbarco **EMC console with CSLD option** and **PA0265XXX0X00** or **PA0300XXXXXX0** probe was evaluated using an alternative test procedure and were certified to within the 95-5 ranges required by the EPA protocols for detecting a leak of 0.20 gallon per hour.

Volumetric Pipeline Leak Detector

The performance of both the rigid and flexible pipeline versions of the Gilbarco EMC and EMC-PC series volumetric line leak detector consoles and probes, **PA02630000501/VLLD** and **PAO316XXXXXX/HGVLLD**, were determined using the EPA protocol for evaluation of pipeline leak detection systems.

When used as an automatic line leak detector, the system was certified capable of detecting a 3 gallon per hour leak within the 95-5 ranges required by the EPA protocols.

When used for monthly monitoring, the system was certified capable of detecting a 0.2-gallon per hour leak within the 95-5 ranges required by the EPA protocols.

When used for line tightness testing, the system was certified capable of detecting a 0.1-gallon per hour leak within the 95-5 ranges required by the EPA protocols.

Pressurized Line Leak Detectors

The Gilbarco EMC and EMC series pressurized line leak detector consoles and probes, **PA0263000060X/PLLD** and **PA0263000060X/WPLLD,** were evaluated using the Standard Test Procedures for Evaluating Leak Detection Methods: Pipeline Leak Detection Methods.

When used as an automatic line leak detector with rigid and flexible piping, the PLLD system was certified capable of detecting a 3 gallon per hour leak within the 95-5 ranges required by the EPA protocols.

When used as a monthly monitoring leak detector with rigid and flexible piping, the PLLD system was certified capable of detecting a 0.2 per hour leak within the 95-5 ranges required by the EPA protocols.

When used as a line tightness test with rigid and flexible piping, the PLLD system was certified capable of detecting a 0.1-gallon per hour leak within the 95-5 ranges required by the EPA protocols.

When used as an automatic line leak detector with rigid piping, the WPLLD system was certified capable of detecting a 3 gallon per hour leak within the 95-5 ranges required by the EPA protocols.

When used as a monthly monitoring leak detector with rigid piping, the WPLLD system was certified capable of detecting a 0.2 per hour leak within the 95-5 ranges required by the EPA protocols.

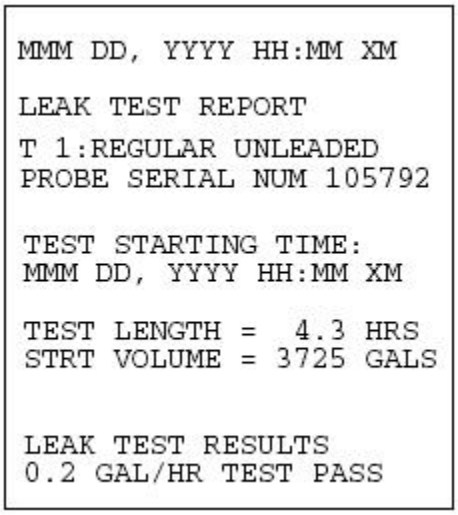
When used as a line tightness test with rigid piping, the WPLLD system was certified capable of detecting a 0.1-gallon per hour leak within the 95-5 ranges required by the EPA protocols.

Liquid Sensors

Testing of the liquid sensors was conducted in accordance with a modified version of the EPA Standard "Liquid-Phase Product Detectors" protocol.

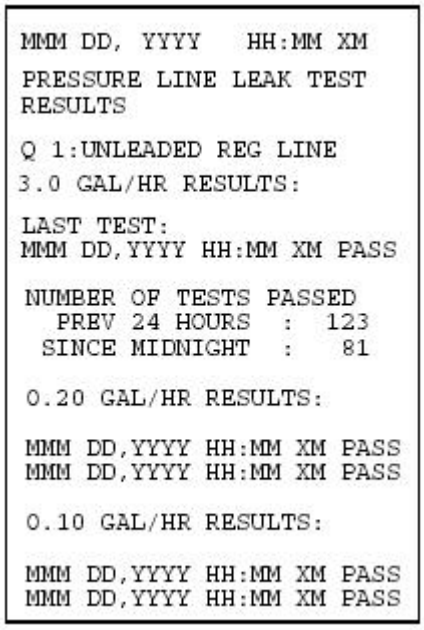
MONITORING SYSTEM OUTPUT

Detailed here are examples of the typical, Tank Leak Report, Line Leak Test Report, Continuous Statistical Leak Report (CSLD), and Sensor Status Report. (Site Name/Address is printed on 1ST sheet of report)



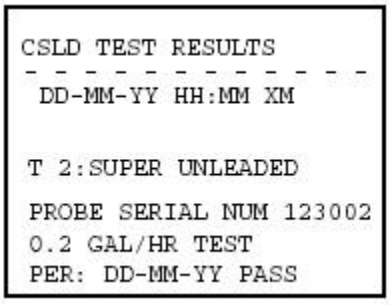
```
MMM DD, YYYY HH:MM XM

LEAK TEST REPORT
T 1:REGULAR UNLEADED
PROBE SERIAL NUM 105792

TEST STARTING TIME:
MMM DD, YYYY HH:MM XM

TEST LENGTH =  4.3 HRS
STRT VOLUME = 3725 GALS


LEAK TEST RESULTS
0.2 GAL/HR TEST PASS
```

Tank Leak Report Example: Last leak report for all active tanks.



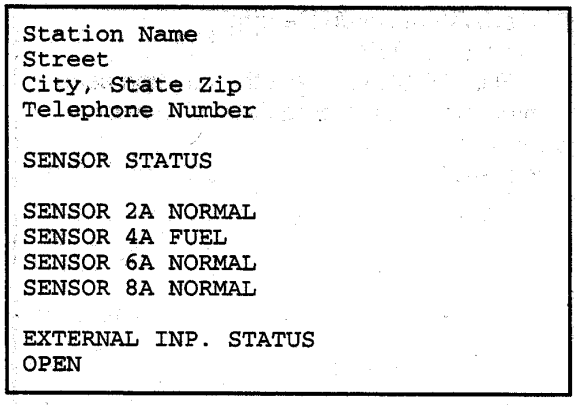
```
MMM DD, YYYY   HH:MM XM
PRESSURE LINE LEAK TEST
RESULTS

Q 1:UNLEADED REG LINE
3.0 GAL/HR RESULTS:

LAST TEST:
MMM DD,YYYY HH:MM XM PASS

NUMBER OF TESTS PASSED
   PREV 24 HOURS  :  123
  SINCE MIDNIGHT  :   81

0.20 GAL/HR RESULTS:

MMM DD,YYYY HH:MM XM PASS
MMM DD,YYYY HH:MM XM PASS

0.10 GAL/HR RESULTS:

MMM DD,YYYY HH:MM XM PASS
MMM DD,YYYY HH:MM XM PASS
```

Line Leak Report Examples: Automatic, Monthly, and Annual.



```
CSLD TEST RESULTS
- - - - - - - - - - - -
 DD-MM-YY HH:MM XM

T 2:SUPER UNLEADED
PROBE SERIAL NUM 123002
0.2 GAL/HR TEST
PER: DD-MM-YY PASS
```

Auto Leak Report Example: Current status of 24-hour leak detection (CSLD) for all active tanks.



```
Station Name
Street
City, State Zip
Telephone Number

SENSOR STATUS

SENSOR 2A NORMAL
SENSOR 4A FUEL
SENSOR 6A NORMAL
SENSOR 8A NORMAL

EXTERNAL INP. STATUS
OPEN
```

Sensor Status Report Example

LIMITATIONS / CONDITIONS OF APPROVAL

General

- All monitoring equipment shall be installed, calibrated, operated, and maintained in accordance with the manufacturer instructions, and certified every 12 months for operability, proper operating condition, and proper calibration. Records of sampling, testing, or monitoring shall be maintained in accordance with **Comm 10.625**.

- The manufacturer shall submit for a revision to this Wisconsin Material Approval application if any of the functional performance capabilities of this equipment are revised. This would include, but not be limited to changes in software, hardware, or methodology.

- While 3rd party testing does determine a required minimum tank level, EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. Consistent testing at low levels could allow a leak to remain undetected.

  During leak testing, a minimum level of product in tank shall be maintained so as to ensure testing of the portion of the tank and/or piping that routinely contains product, regardless of testing system capability. For instance, if product levels are routinely maintained at 60%, but the leak detection system is capable of testing at 15% product level, then testing shall be performed at 60% levels.

- If performing a tank tightness test, minimum tank level shall be 95%, regardless of leak detection system minimum capability, in accordance with **Comm 10.61 (3)**.

Tank Monitoring ATG's and Tightness Testing(static monitoring)

EMC Basic Monitoring System:

- Critical performance parameters for the **PAO238000XXXX** probe with the **TM-2**, **TM-3** and **EMC** consoles: (Note: These are capacitance probes and they will not work with oxygenated fuels)

Parameter	Value
Maximum Tank Size[1]	**Up to 15,000 gallons**
Software Version	**N/A**
Minimum Tank Level	**50 %**
Waiting time between filling tank or dispensing and test start[2]	**8 hours, 18 minutes minimum**
Minimum Test Period[2]	**5 hours[3]**

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: There must be no dispensing or delivery during waiting time or testing.
3: This probe can only perform a 0.2 gph monthly test.

- Critical performance parameters for the **PAO264XXX0000** probe with the **TM-2**, **TM-3** and **EMC** consoles: (Note: These are capacitance probes and they will not work with oxygenated fuels)

Parameter	Value
Maximum Tank Size[1]	**Up to 15,000 gallons**
Software Version	**N/A**
Minimum Tank Level	**50 %** (monthly- 0.2 gph) **95 %** (annual- 0.1 gph)
Waiting time between filling tank and test start[2]	**8 hrs. 18 min. minimum** (monthly- 0.2 gph) **8 hrs. 15 min. minimum** (monthly- 0.1 gph)
Waiting time between dispensing and test start	**See note 3 below** (monthly- 0.2 gph) **30 minutes minimum** (monthly- 0.1 gph)
Minimum Test Period[2]	**2 hours**

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: There must be no dispensing or delivery during waiting time or testing.
3: For a 0.2 gph monthly test, there can be no filling (delivery) or dispensing from tank during waiting period.

- Critical performance parameters for the **PAO265XXX0X00** probe with the **TM-2**, **TM-3** and **EMC** consoles: (Magnetostrictive probe)

Parameter	Value
Maximum Tank Size[1]	**Up to 15,000 gallons**
Software Version	**N/A**
Minimum Tank Level	**50 %** (monthly- 0.2 gph) **95 %** (annual- 0.1 gph)
Waiting time between filling tank and test start[2]	**8 hrs. 18 min. minimum** (monthly- 0.2 gph) **8 hrs. 15 min. minimum** (annual- 0.1 gph)
Waiting time between dispensing and test start	**30 minutes minimum** (monthly- 0.2 gph) **30 minutes minimum** (annual- 0.1 gph)
Minimum Test Period[3]	**2 hours** (monthly- 0.2 gph) **3 hours** (annual- 0.1 gph)

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: There must be no delivery during waiting time.
3: There must be no delivery or dispensing during testing.

EMC/PC Series Monitoring System:

- Critical performance parameters for the **PAO265XXX0X00** and **PAO300XXXXXX0** probe with the **EMC-PC** consoles: (Magnetostrictive probe) (Note: These probe/console combinations can only perform a 0.2 gph monthly test)

Parameter	Value	
Maximum Tank Size[1]	**Up to 20,000 gallons**	
Software Version	**N/A**	
Minimum Tank Level	Minimum product level is based on tank diameter as follows:	
	Probe Working Length (Tank ID) (inches)	**Minimum Level (in)[2]**
	24 thru 26	9
	27 thru 36	12
	37 thru 47	15
	48 thru 58	18
	59 thru 69	21
	70 thru 79	24
	80 thru 90	27
	91 thru 101	30
	102 thru 111	33
	112 thru 122	36
	123 thru 133	39
	134 thru 143	42
	144 thru 154	45
	155 thru 165	48
	166 thru 175	51
	176 thru 177	54
Waiting time between filling tank and test start[3]	**8 hours minimum[4]**	
Waiting time between dispensing and test start	**30 minutes minimum**	
Minimum Test Period[5]	**2 hours**	

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: Minimum level from probe bottom is same as product level in tank, assuming the typical configuration where the probe touches the bottom of the tank.
3: There must be no delivery during waiting time.
4: These probe/console combinations can only perform a 0.2 gph monthly test.
5: There must be no delivery or dispensing during testing.

Tank Monitoring ATG's w/CSLD(24-hour, 0.2 gph monthly monitoring)

- Critical performance parameters for the **PAO265XXX0X00w/CSLD** and **PAO300XXXXXX0w/CSLD** probe with the **TM-2**, **TM-3** and **EMC** consoles: (Magnetostrictive probe)

Parameter	Value
Maximum Tank Size[1]	**45,000 gallons** (Single Tank) **37,000 gallons** (Manifolded Tanks)
Software Version	**N/A**
Minimum Tank Level[2]	**5%**
Maximum Monthly Throughput	**227,559 gallons** (Single Tank) **226,848 gallons** (Manifolded Tanks)

1: Manifolded tank capacity is an aggregate capacity of all tanks.
2: The CSLD system will automatically check the tank level, and not perform a test if the tank level is below the minimum.

Electronic Line Leak Detectors

- The Gilbarco Electronic Line Leak Detectors are approved for use on pipeline systems for underground storage tank facilities that contain petroleum or other chemical products. It is approved for use on rigid piping and flexible piping.

- An annual test of the operation of the leak detector shall be conducted in accordance with the manufacturer requirements for testing to the recognized leak thresholds by inducing a physical line leak. The individual performing the test must be qualified by the equipment manufacturer or an individual meeting the requirements of **Comm 5.88** for pipe testing.

- **Mechanical line leak detectors shall be removed from the pipeline before testing.**

- This test cannot be used if trapped vapor is present in the system.

Volumetric

- Critical performance parameters for the **PA02630000501/VLLD** and **PAO316XXXXXX/HGVLLD** probes with the **EMC** and **EMC-PC** consoles: (Note: The PAO316XXXXXX/HGVLLD probe is the same as the PA02630000501/VLLD probe, except the system has a strainer installed for high flow applications)

Rigid Piping: (Fiberglass or steel)

Parameter	Value
Maximum Test Line Size	**3 in.**
Total maximum allowable volume of product in any **rigid** test pipeline	**158 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Flexible Piping:

Parameter	Value
Minimum Flexible Piping Bulk Modulus	**Not Applicable for volumetric systems**
Total maximum allowable volume of product in any **flexible** test pipeline	**49.6 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Pressurized

- Critical performance parameters for the **PA0263000060X/PLLD** probe with the **EMC** and **EMC-PC** consoles:

Rigid Piping: (Fiberglass or steel)

Parameter	Value
Maximum Test Line Size	**3 in.**
Total maximum allowable volume of product in any **rigid** test pipeline	**98.4 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Flexible Piping:

Parameter	Value
Minimum Flexible Piping Bulk Modulus	**User selectable on console. For a list of currently approved piping, contact Gilbarco.**
Total maximum allowable volume of product in any **flexible** test pipeline	**40.8 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

- Critical performance parameters for the **PA0263000060X/WPLLD** probe with the **EMC** and **EMC-PC** consoles: (Note: This probe is 3rd party certified for rigid piping only)

Rigid Piping: (3" Fiberglass or steel)

Parameter	Value
Maximum Test Line Size	**3 in.**
Total maximum allowable volume of product in any **rigid** test pipeline	**100 gallons or less**

Note: All other critical parameters, such as test line pressure; minimum test times; minimum wait times between product dispensing and start of test are pre-programmed into the software and are not accessible for viewing.

Liquid Sensors

- The Liquid Sensors shall be placed such that a release from any portion of the tank or piping will be detected.

- Reference the Sensor-Console Application Chart under the Description and Use section of this material approval for application of appropriate sensor for the product.

This approval will be valid through December 31, 2007, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Reviewed by: _____
Greg Bareta, P. E.
Engineering Consultant
Bureau of Petroleum Products and Tanks

Approved by: _____ Date: _____